

CLAIMS

1. A management system for a working machine, for managing usage states of a working machine (1) by a plurality of users (A, B, and C), comprising:

    a working machine (1); and

    a server (10) being capable of communication via a wireless communication network with the working machine, and also capable of communication with a plurality of user terminals (20),

    the working machine (1) comprising

        identification information input means (13B) which inputs user identification information of one user who is using the working machine (1) at the present time;

        machine information generation means (12) which receives a signal from a predetermined sensor within the working machine (1) and generates machine information related to a state or to an operation of the working machine (1); and

        a communication device (13, 15) which can perform communication with the server (10) via the wireless communication network, and which transmits to the server (10) the user identification information which has been inputted by the identification information input means (13B) and the machine information which has been generated by the machine information generation means (12),

    the server (10) comprising

        storage means (43) which stores information;

        communication control means (41) which can perform communication with the working machine (1) via the wireless

communication network, which also can perform communication with the plurality of user terminals (20), and which receives the user identification information and the machine information from the working machine (1) and transmits a warning to the plurality of user terminals (20);

usage state decision means (44, 45, 46) which detects by which user usage of the working machine (1) which constitutes a problem is performed, based on the user identification information and the machine information received by the communication control means (41); and

warning generation means (47) which generates the warning in response to the usage state decision means (44, 45, 46), and transmits the warning to the plurality of user terminals (20) by the communication device (41).

2. The management system according to Claim 1, wherein the working machine (1) comprises a working time sensor (11), the machine information includes working time information showing a working time which has been detected by the working time sensor (11), and

the usage state decision means (44, 45, 46) comprises reservation information reception means (44) which receives reservation information showing a scheduled time for use of the working machine (1) from each user terminal (20) and user identification information of the one user who has made the reservation, and which stores the received reservation information in association with the user identification information in the

storage means (43);

machine information reception means (45) which, based on the user identification information and the working time information included in the machine information received by the communication control means (41), generates actual usage information which shows the time and date of actual usage of the working machine (1) due to each user, and stores the actual usage information in association with the user identification information in the storage means (43); and

information comparison means (46) which, by comparing the reservation information associated with the user identification information stored in the storage means (43) with the actual usage information, detects, as the usage which constitutes a problem, actual usage due to a user for which, in the user or the usage time, a substantial difference from the reservation information exists.

3. The management system according to Claim 1, wherein the working machine comprises a position measurement sensor (14),

the machine information includes position information showing a position which has been detected by the position measurement sensor (14), and

the usage state decision means (44, 45, 46) comprises:

reservation information reception means (44) which receives reservation information showing a scheduled place for use of the working machine (1) from each user terminal (20) and user identification information of the one user who has made the

reservation, and which stores the received reservation information in association with the user identification information in the storage means (43);

machine information reception means (45) which, based on the user identification information and the position information included in the machine information received by the communication control means (41), generates actual usage information which shows the actual usage place of the working machine (1) due to each user, and stores the actual usage information in association with the user identification information for each user in the storage means (43); and

information comparison means (46) which, by comparing the reservation information in association with the user identification information stored in the storage means (43) with the actual usage information, detects, as the usage which constitutes a problem, actual usage due to a user for which, in the usage place, a substantial difference from the reservation information exists.

4. The management system according to Claim 1, wherein the working machine (1) comprises an engine cooling water temperature sensor (11B),

the machine information includes water temperature information showing an engine cooling water temperature which has been detected by the engine cooling water temperature sensor (11B), and

the usage state decision means (44, 45, 46) comprises: machine information reception means (45) which, based on the

user identification information and the water temperature information included in the machine information received by the communication control means (41), calculates the engine water temperature or the load amount of the working machine (1) which originates in usage due to each user; and

information comparison means (46) which, based on the engine water temperature or load amount, for each user, which has been calculated by the machine information reception means (45), detects, as the usage which constitutes a problem, usage imposing an excessive load on the working machine (1), performed by a user.

5. A management system for a working machine, for managing the usage state of a working machine (1) by a plurality of users (A, B, and C), comprising:

a working machine (1); and

a server (10) which are capable of communication via a wireless communication network, and is also capable of communication with a plurality of user terminals (20),

the working machine (1) comprising

identification information input means (13B) which inputs user identification information of one user who is using the working machine (1) at the present time;

machine information generation means (12) which receives a signal from a predetermined sensor within the working machine (1) and generates machine information related to the state or to the operation of the working machine (1); and

a communication device (13, 15) which can perform communication

with the server (10) via the wireless communication network, and which transmits to the server (10) the user identification information which has been inputted by the identification information input means (13B) and the machine information which has been generated by the machine information generation means (12), and

the server (10) comprising storage means (43) which stores information; communication control means (41) which can perform, via the wireless communication network, communication with the working machine (1), which also can perform communication with the plurality of user terminals (20), and which receives the user identification information and the machine information from the working machine and transmits a usage state report to the plurality of user terminals (20);

load amount calculation means (45, 46) which calculates a cumulative load amount of the working machine (1) resulted from use by each user, based on the user identification information and the machine information received by the communication control means (41), and which calculates a usage proportion for each user based on the cumulative load amount for each user; and

report information processing means (49, 52) which, in response to the load amount calculation means (45, 46), generates report information showing the cumulative load amount and the usage proportion for each user, and transmits the report information to the plurality of user terminals (20) by the communication device

(41).

6. The management system according to Claim 5, wherein the load amount calculation means (45, 46) calculates a load amount, for each unit interval, during the period of usage by each user (A, B, and C), weights the load amounts for each unit interval according to the magnitude of the load amounts, and calculates the cumulative load amount, for each user, by totaling the load amounts, for each unit interval, which have been weighted.

7. The management system according to Claim 5, wherein the working machine (1) comprises a working time sensor (11) and an engine cooling water temperature sensor (11B), the machine information includes working time information showing a working time detected by the working time sensor (11), and water temperature information showing an engine cooling water temperature detected by the engine cooling water temperature sensor (11B), and

the load amount calculation means (45, 46) calculates the cumulative load amount of the working machine (1) resulted from use by each user, based on the user identification information which has been received by the communication control means (41) and the working time information and the water temperature information which are included in the machine information.